Issue 58
October 2024

Utah Valley Amateur Radio Club

The UVARC Shack

Swapping memories

Richard Bateman KD7BBC is ready to sell Signal Sticks and other antennas at the ***2024 Utah Valley Swap Meet*** in Spanish Fork. We had a great turnout this year, plus Dave Becar KI6OSS held an exam session just outside the pavilion.

In this issue of the *UVARC Shack*

Club meetings feature voting repeater systems, plus our annual elections and an RF detector.

My Shack spotlights KC7XP. *Amateurs in Action* on Uncompahgre. *Brass Tacks* on connectors.

Dear Annette on grounding J-poles and using your radio as a scanner. *Hot Tips* for long HT antennas. *DIY* for an RTL-SDR waterfall. *The Amateur in You* on which radio to start out with and your amateur radio milestones.

Please send your ideas, stories, questions, gripes, and photos to ***uvarcshack@gmail.com***

Inside this issue

Club meetings	2
My Shack	5
Amateurs in Action	6
Brass Tacks	9
Dear Annette	17
DIY	21
Living in the Past	25

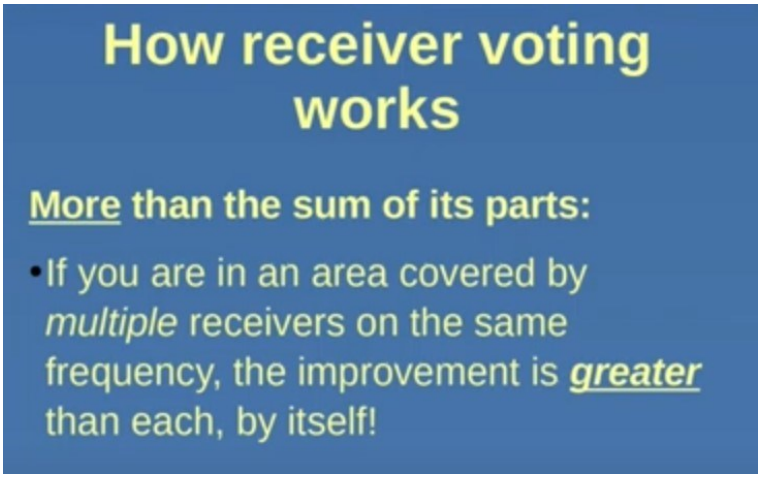
Other points of interest

- *New Hams and Upgrades* 7
- *The Amateur in You* 18, 19
- *Hot Tips* 20
- *Test your knowledge* 27
- *Upcoming Contests, Regular Nets* 28
- Ham radio courses, exam sessions 28, 29
- *Across the Pond* 29
- Who we are 31

Club meetings

Recap

August 2024 club meeting – Voting Repeater System


How receiver voting works
More than the sum of its parts:
•If you are in an area covered by multiple receivers on the same frequency, the improvement is greater than each, by itself!

Clint Turner KA7OEI educated us about the 146.620 voting repeater system, in which the repeaters on Farnsworth Peak and Scott Hill are connected by a "voting controller" that selects between the repeater receiving the lowest noise, to re-transmit operator signals. Many of the club meeting attendees were unaware such a thing existed until that night, and were fascinated to learn about it and how it works. Clint has an extensive knowledge of repeaters, and is currently the primary UARC repeater engineer. He is also the engineer for the Utah Web SDRs in Corinne and Leamington. You can see the YouTube video here.

September 2024 club meeting – Elections and RF Detector

It's election time again, and the five presidency members were up for re-election, but this time our Activities Specialist Michele Costello KI7HBP had decided not to run. Joe Costello WH6QV, Michele's husband, ran for Activities in her place, and was voted in with the other four incumbents. The new club presidency is as follows:

President : Noji Ratzlaff KNØJI Vice President : Chad Buttars WE7CB

Secretary : Caryn Alarcon KG7UUR Activities Specialist : Joe Costello WH6QV

Technology Specialist : Trevor Holyoak AG7GX

Congrats to all the election winners! We look forward to another fun year of ham radio. Thanks to Alma Perry W1ZGY for running the election and organizing the voting.

Following the elections, Noji KNØJI filled the remaining time by giving a brief presentation on how to make a simple ***RF detector***. You can see the meeting video here.

By the way, many of our past meetings are recorded and posted on the club YouTube channel.

Utah Valley Swap Meet

In photos

Utah Valley Swap Meet

In photos

My Shack

Highlighting the shack (ham equipment and room) of a member, to give others an idea of the possibilities that might work for them

Doryl Lish KC7XP

I was probably about 10 years old when I first read the words "ham radio" in a book called "Mad Scientist's Club". That piqued my interest, but it wasn't until I was in 8th grade that I started trying to find out about how to get a license. That year, our science teacher offered to take a group of us to a town about 50 miles away where a Lafayette store had all sorts of kits that could be used for science fair projects. I bought a small module that I only had to add a few resistors, a speaker, and a microphone, and could transmit on the AM band. That got me hooked. The next year, I built an FM transmitter from discrete components. I found a book on how to get my license, but the formulas were too intimidating for me, so I put away my ambition for a while.

In high school I discovered that my band director was licensed, the first person I had ever known that actually held an amateur radio license. At a band camp I watched as he operated his mobile station and spoke with a relative that was 750 miles away. I was blown away. I started trying to study again, but still just couldn't settle down enough to really understand the material.

Fast forward a few more years. My band director's son, a good friend who was also licensed, made a cassette tape of random CW characters for me. I studied the ARRL license manual during my lunch breaks at my summer job and listened to the random characters while in my car, and eventually signed up for the test with the FCC.

At that time, we had to wait for the FCC to come to town to administer the test once per year. I didn't quite make the 13 wpm required by the General exam the first year, so I had to settle for a Technician license, and my call sign was N7DBD. The next year, I studied and practiced the code, and when the FCC came around I passed the Advanced license exam, allowing me to get my current call sign of KC7XP, which I have proudly held now for more than 40 years. In 2012, I finally decided to get my Extra license and access to the few added sections of the bands, but mostly so I can hopefully start helping with exams.

My favorite aspect of ham radio is the fact that I can have a radio and a piece of wire, and be connected to just a battery, and talk to someone with nothing else in between. I have listened many times to amateur radio in action during emergencies that were far away.

My station is modest, with a VHF/UHF mobile in my vehicle, some handhelds, and an HF radio with two antennas: one 80 meter dipole that has a feed point only 20 feet high, and a 4-band Mosley vertical that someone gave me early in my experience as an operator.

Amateur radio has provided much enjoyment for me. I've been helped along the way by many hams, and I hope to be able to help others as I continue my journey. When mobile, my radio is always on scan, and if I hear somebody call on 146.520, I try to answer.

- 73, Doryl

Amateurs in Action

Recounts of ham radio operators who have used their effort and skills to help others in a time of need

Rescue on Uncompahgre

Bob KCØCY (now KØNR)

It was Saturday 08 August 1992, before "mobile" phones were commonly available, Bob Witte KCØCY, his brother, and two nephews had just summitted Uncompahgre Peak and signed the log. He called out on 146.520 (the National Simplex) on his Kenwood TH-77A handheld to contact anybody listening to let them know of their achievement. Chris Webb NQ5V, possibly vacationing away from his Texas home, was the first to answer.

As Bob and company were about to start down the mountain, they were met by a young man who said he was sent to find "the guy with the radio." Bob then asked Chris to stand by while he looked into a potential medical emergency. After a second hiker approached Bob and related the same incident with more details, Bob asked Chris, and afterwards Arnold Stroud W7JRC to call the authorities and alert EMS to the situation.

Arnold got hold of the Ouray County Sheriff's Office and related the emergency. While monitoring, Jim Silverthorn NR5Y announced that he had contacted the Mineral County Sheriff's Office. Soon, Doug Schwinn NØLAY jumped onto the National Simplex to offer radio assistance, because he had been monitoring them and communication by the Hinsdale County (the actual county of the incident) Sheriff regarding the situation. *Once Doug gave me the Sheriff's frequency, I programmed it into my Kenwood HT and started monitoring too*, reported Bob.

As more EMS arrived at the scene, it became clearer that the victim was a young lady hiker who got hit in the face by a falling rock that had worked loose and hurtled down at her. She was unable to walk on her own, so the emergency crew dispatched a chopper to help get her off the mountain. The one Hinsdale *Flight-for-Life* helicopter was already deployed, so they requested help from a non-equipped two-seater, which was able to pick her up and take her to the trailhead, where an ambulance was waiting.

Unforgivable Uncompahgre Peak

According to the SAR (Search and Rescue) guy on a trail bike, the girl had facial cuts, internal bleeding, lost some teeth, and had facial swelling, but was otherwise in stable condition. He said that, with the radio contact, he would likely have gotten the call about the time his shift ended. Doug calculates that this means amateur radio had cut down the response time by nearly five hours. *It has certainly caused me to take this emergency communication thing more seriously.*

You can read more about the rescue on Bob's Blog and another by Bob's nephew Mark.

New Hams and Upgrades

New hams

KK7UQG = Benjamin McNaughton
KK7UQJ = Jonathan Spencer
KK7UQN = Elijah Castleton
KK7URB = Gavin Hansen
KK7UTK = Kaden Pyne
KK7UTZ = Steven Stewart
KK7UVV = Aaron Herbert
KK7UWC = Devan Thompson
KK7UXO = Nathaniel Wilkerson
KK7UXQ = Andrew Thornton
KK7UXS = Seth Stringham
KK7VCG = Nick Mills
KK7VFR = Amber Cook
KK7VIO = Eric Eberly
KK7VIX = Terry Roueche
KK7VIY = Brad Clawson
KK7VIZ = Melinda Eberly
KK7VJA = Catherine Roueche
KK7VKV = David Call
KK7VLH = Wendell Barnes
KK7VLM = AnnElyse Tews
KK7VLN = Benjamin Tews
KK7VLO = Ronald Tews
KK7VLQ = Daniel Shaffer
KK7VLS = Christopher McClain
KK7VNZ = Jenifer Jones
KK7VOA = Mitchell Baird
KK7VOR = Joshua Austin
KK7VOS = Erich Sagers

Upgraded hams

KK7QON = Joe Devereaux (General)
KK7RXQ = Andrew Mulkern (General)
KK7TWZ = Robert Richards (General)
KJ7FUB = Dave Boucha (Extra)
KCØVXX = Kevin Mitchell (General)

Congratulations to all these diligent folks! We look forward to hearing you on the radio soon.

Events

Upcoming happenings

DIY Night

Our November 2024 club meeting will be our annual DIY (do-it-yourself) night, where you can learn (or help teach!) a skill or concept to club members. This one will be held Thursday 07 November at the Orem Senior Friendship Center, 93 N 400 E, starting 6:30 pm. Come learn about soldering, installing a connector, using Anderson Powerpoles, how to apply heat shrink, how to program a radio, how to set up your own mini-repeater, how to analyze an antenna, and more. Details and info as we get closer.

If you'd like to showcase a concept, please let one of the club leadership know. We'll give you a half-table to set up your demo and poster board or literature!

2024 Annual Christmas Potluck

Set aside the night of Thursday 05 December from 6:00 pm, for the biggest potluck of the year, at the Orem Senior Friendship Center, 93 N 400 E. We'll announce a sign-up sheet later. Santa said he's planning to be there to sample our goodies, so bring your little ones, to get photographed with Jolly ol' St. Nick himself. Seconds for those who get their photo taken on his lap. We'll also have tables set up in back for you to show off your latest projects. More details to come.

76ers Santa Net

The 76ers Santa Net tradition continues! The revered and long-anticipated net will take place on Monday December 23 and Tuesday December 24, at 6:00 pm on the 146.760 MHz repeater. Open to anybody, young or small, who wants to talk with Santa, with at least one licensed operator present. To participate, simply bring your little ones to the radio, have them announce your call sign into the microphone when Santa asks for them, and when Santa calls for them, they can talk away at will. When they're done, they can say Thanks, give your call sign, and turn it back to Santa. No need for you to say anything, or intervene in any way, unless they're too young to do or say some of that.

Winter Field Day 2025

The Utah Valley Amateur Radio Club is planning to participate in Winter Field Day 2025 at the Lindon Marina, and all are invited. We'll be setting up our station as early as Friday January 24, but we'll actually be on the air, calling *CQ Field Day!* from noon Saturday January 25 through noon Sunday. Our exchange will be **3M UT**.

We'll need help setting up antennas, radios, and other parts of our three stations starting early Saturday morning. Afterwards, we'll need help taking it all down Sunday, right at noon too. Please bring gloves. The club will provide dinner in the form of pizza and soft drinks between 5 pm and 6 pm Saturday January 25 inside or next to one of the trailers. All hams and their families are welcome to join the fun! This might be your opportunity to get on the air and make your first HF contact, even if you have no license. This is the link to the location. And this is the link to our Winter Field Day information page.

Brass Tacks

An in-depth look at a radio-related topic

Connectors

One thing that seems unavoidable in the amateur radio world is the need to attach one piece of ham radio equipment to another. The piece of hardware that provides this attachment is known as a ***connector***, and there are many different types, as well as many models for each type. This discussion lists and describes those most commonly encountered in the world of amateur radio, both plugs (typically male) and sockets (typically female).

The majority of the connectors discussed below are directly related to the electrical joining of ham radio gear. A few are not typically relevant to radio, such as video connectors, yet are included here as their gradual integration expands the feature set of auxiliary if not primary equipment. I've listed the categories of connectors by usage type, understanding that some can easily fit into multiple classifications. Finally, I list some of the important connectors that are not detailed in our discussion.

Coaxial cable connectors

- **PL-259 / SO-239** : gendered screw-on mates of 50-ohm connectors often mis-labeled "UHF" connectors, their names having originated from the US Army designations for a male plug ("PL") and female socket ("SO") pair. Perhaps the most common type for coaxial cable and radio antenna connections, and is reliable for most HF and VHF applications, but is heavily used for 70 cm operation as well. Easily subject to water intrusion, they must be protected by a weatherproof seal when installed outdoors.

PL-259 (left) and SO-239 (right)

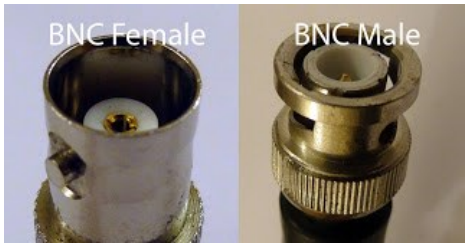
- **SMA** : "subminiature A" is a gendered screw-on type of 50-ohm connector used for 0 Hz to 18 GHz applications, and widely used on today's HTs (handheld transceivers).

- **N** : gendered screw-on type of 50-ohm weatherproof connector, named for Paul Neill of Bell Labs. The first coaxial cable connector to support microwave frequencies, today's N connector meets military specifications (MIL-STD-348) and can easily handle up to 11 GHz or 18 GHz, depending on the manufacturer.

Brass Tacks

continued

- **BNC** : ("bayonet Neill-Concelman") gendered twist-and-snap-on (quick-disconnect) type of 50-ohm and 75-ohm connector widely used in video, audio, and radio applications, plus test instrumentation up to 2 GHz and 500 volts.

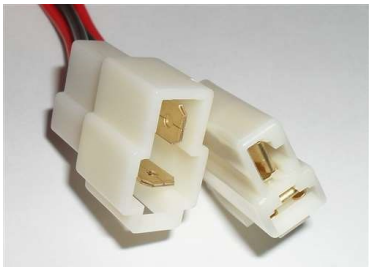


Power connectors

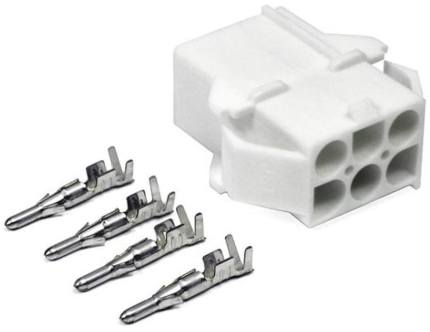
- **Anderson Powerpole** : the Powerpole has become the *de facto* standard for amateur radio genderless DC power connections since its adoption by ARES. When properly assembled, they can connect to any other Powerpole connector while maintaining proper polarity, and can remain connected for many years in spite of reasonable vibration. Many ham radio operators convert most, if not all, their DC power connections to Anderson Powerpoles for simple equipment interconnection convenience without needing to be concerned about connection gender / polarity.

Anderson Powerpole pair

- T : also called *T-type*, *T-style*, *Molex T* or *OEM-T*, a two-blade gendered DC power connector commonly installed by radio manufacturers. The two blades are mounted perpendicular to each other, and the plug end uses a tabbed latch to provide a secure connection with the jack.



- Molex : name of a company that manufactures a variety of electrical connectors, and whose name has become synonymous with their products. So, referring to a *Molex connector* out of context is rather ambiguous, yet many transceiver, power supply, amplifier, and tuner manufacturers use that term for their versions of DC connectors. Pictured at the right is perhaps the most common of them found on many modern transceivers, especially HF rigs.

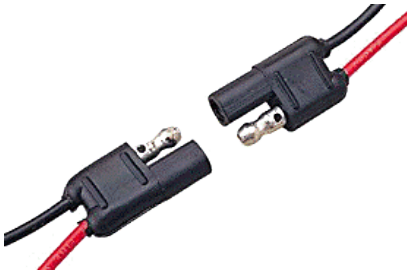


Brass Tacks

continued

- **MC4** : ("Multi-Contact, 4 mm") the *de facto* common DC power connector found on a modern solar panel, and the devices (charge controller, inverter, and other solar panels) they tend to connect to. An MC4 is a gendered locking, weatherproof, high-voltage (up to 1500 volts), high-current connector that, once connected, requires a special tool to disconnect. Unlike most power connectors that combine both positive and negative terminals into a single housing or coupling, MC4 connectors typically appear in separate negative and positive connections, to more easily accommodate strings of series-connected panels.

- **SAE** : ("Society of Automotive Engineers") often called a *bullet connector* and *trailer plug*, this weather-resistant genderless coupling is used heavily on vehicles for connecting power to lights, small motors, and other accessories. The SAE plug was once widely used on amateur radio equipment for DC power, but has largely been replaced by other types.



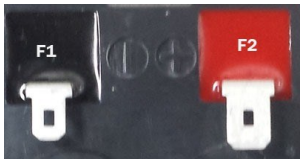
- **auxiliary** or accessory ("cigarette lighter") power outlet and plug commonly found inside vehicles for convenient 12-volt access. Some recent power supplies and power banks are manufactured with this auxiliary power socket built onto them, and some 12-volt cords are made with the plug, which typically includes an internal fuse for protection. Unfortunately, some hams are tempted to connect their transceivers using an auxiliary plug into their vehicle's auxiliary outlet, only to discover that transmitting on high power can easily burn out the fuse. Either discipline yourself to limit your transmitting power or wire your rig fused (25 A) straight to the battery.

- **banana** : single-wire genderless connector (often called a banana plug) is a single protruding rod with spring metal applying outward force into a smooth, solid cylindrical receptable. Banana plugs are often used for test equipment, experimental hookups, and hobby power supplies to make temporary but reliable low-power connections.

Brass Tacks

continued

- **F1, F2** : ("FASTON") flat, gendered blade-like terminals, also called *tab*, and attached by a *spade lug*. Very common on utility SLA (sealed lead-acid) batteries, like those used in scooters and UPSs (uninterruptible power sources.)



- XT60 : ("hexTronik 60 amp") gendered, secure, high-current, high-voltage, high-impact connector originally made for drones and other RC (remote controlled) craft, but is used in many experimental and demanding environment applications. The XT60 is rarely found among amateur radio gear, but is occasionally used by serious multi-interest hobbyists.

Antenna connectors

An ***antenna connector*** is more properly called an antenna ***mount***, because its purpose is to allow an antenna to be mounted to some frame or structure, yet its electrical connection also allows for the conduction of RF (radio frequency) signals. The antenna is attached to the mount, and the mount is attached to the structure.

- **NMO** : ("New Motorola") ¾˝ screw-on mount that attaches to the metal frame of a vehicle or other flat metal surface. An antenna with an NMO connector screws onto the mount, with double O-rings to prevent water intrusion into the vehicle.

- 3/8-24 : (the "3/8-24" designation is merely a thread size, meaning 3/8˝ in diameter and 24 threads per inch) common antenna mount for CB radio and some amateur radio antennas. Many antennas have no more than a machine screw end, threaded for 3/8-24, and it's expected that the user will install it into a mount that has been securely installed on a vehicle or structure. The mount pictured on the right is known as a ***stud*** mount, and features a 3/8-24 thread on one end and an SO-239 connector on the other.

- PL-259 : same as the "PL-259" connector listed above for coaxial cable, only machined or installed on an antenna end. This type of antenna connector is typically more common on antennas or mounts made for CB radio installations than for amateur.

Brass Tacks

continued

- **F** : gendered screw-on type of inexpensive 75-ohm connector very commonly used for cable TV. Its compression fitting is made for frequencies exceeding 1 GHz, making them suitable for UHF work. Although not typically weatherproof, some water-tight and corrosion-resistant versions exist for outdoor cable installation.

- QD : (quick-disconnect) gendered bayonet-style connector often used on antenna mounts to rapidly attach and remove an antenna from its base. The thinner stud on the right uses a male QD connector on one end and a 3/8-24 threading on the other.

Data

A ***data connector*** is one used for interfacing computer hardware to a peripheral such as a printer, controller, keyboard, test equipment, or even a radio. Some data connectors are specific to video display communication, and are listed in a later section.

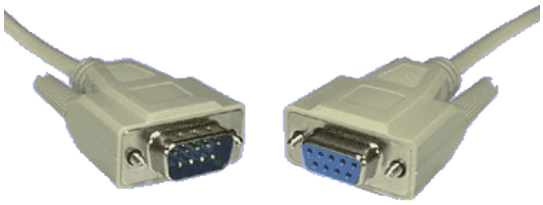
- **USB** : (universal serial bus) gendered high-speed data transfer protocol that appears in a variety of connector types. Seems like newer, higher-speed versions are emerging almost annually.

- **RJ-11**, **RJ-45** : ("registered jack") gendered keyed modular plug and jack commonly used for network cables, land-line telephone cords, computer keyboards, and ham radio microphones.

Brass Tacks

continued

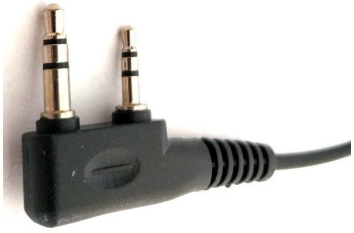
- **DE-9** : ("D-subminiature") gendered two-row pinned connector once commonly used for serial cables and ports, and often mistakenly called "DB-9" connectors.



Radio

This category of connectors is a set of data cables made specifically for communicating with a radio for controlling (PTT), speaking (microphone), listening (speaker), and programming.

- Kenwood / Baofeng : (also called "K head" and "K interface") single plug with two parallel sets of triple-conductor plugs, a 2.5 mm plug and a 3.5 mm plug. A few other manufacturers of HTs use this connector too.



- multi-conductor : single plug with more than two conductors, used by some Yaesu HTs and Apple iPhones.

- Motorola (waterproof) : flat-mounted set of **pogo pins** on a water-tight connector that requires a screw to hold it in place. Some HTs have adopted this connector where water-tightness is an important feature.

Audio and CW

Plugs (omitting their mating sockets) are used to connect headphones, speakers, guitars, and CW keys and paddles.

- 1/8″ (same as 3.5 mm) plug and 2.5 mm plug
- 1/4″ plug
- mono (two-conductor) plugs of the same

Mono 1/8″ plug

Stereo (three-conductor) plugs

Brass Tacks

continued

Video

While not strictly related to amateur radio, people are seeing increasingly more video connections on their radios to display a waterfall, analyzer, and interactive control software. So, it's good to understand the different video connectors if you need to consider them for compatibility or device availability. Not shown are Mac equivalents of the same connectors. Other video connectors include **DVI** and **S-video**, which are rapidly declining in popularity.

HDMI (left) and DisplayPort (right)

VGA (male on the left)

RCA (also called "component video" plugs

Other connectors

Variations on previously listed connectors or less-popular ones, you might encounter these, which have been used on legacy equipment or devices. They're only shown here as a reference, in case you're not sure what they are when you see them, amateur radio-related or not.

TNC

FME

DIN

"mini" UHF

XLR (wired stage microphone)

Brass Tacks

continued

Adapters for some of the above

An *adapter* is a device that possesses at least two different connector types, to allow the connection between devices or cables of incompatible connectors. An adapter can also hold two of the same connector type, to present the same connector by a different gender.

- **jumper/pigtail** : short length of coaxial cable with a connector of one type on one end and a connector of another type on the other end, which allows a flexible adaptation between connectors
- **barrel** : single (typically cylindrical) piece of hardware with the same connector on both ends, to mate different cable sections together
- **multi-headed** : jumper with a connector of one type on one end and a connector of another type on each of two or more other ends, to provide a variety of possible connections

SMA-M to PL-259 jumper or pigtail

USB multi-headed connector

Barrel connectors

Summary

A connector is a physical, especially electrical, device that allows for the manual attachment to a mating piece of hardware. Common connector names can help you understand literature or communicate with others by using the same terminology. While not all connector types are directly related to amateur radio, being acquainted with some of them can help you with compatibility concerns. Many adapters are available for attachments between connectors of different types.

Noji Ratzlaff, KNØJI (kn0ji@arrl.net)

Dear Annette

What's on your mind? Serious, humorous, technical, and thoughtful answers to your deepest, (mostly) ham-related questions.

Dear Annette:

I recently bought one of Carl's J-poles, and read that it doesn't need to be grounded. But later I read some conflicting information saying that it does need to be grounded. Does the J-pole need to be grounded or not?

Tyson in Orem

Dear Tyson:

The kind of J-pole that Carl makes is technically an "end-fed, open-stub" half-wave antenna. Because it's a half-wave antenna, it does not need to be grounded for performance (to make it work right). But if the antenna is installed in the US on a roof, its mast *must* be grounded, according to NEC 810.20. Furthermore, the coax to the same outdoor antenna must be routed through a surge protector ("lightning arrester"), according to NEC 810.15.

Dear Annette:

Can I use my HT as a police scanner?

Gary in Bluffdale

Dear Gary:

Your HT (handheld transceiver) can work *a little* like a police scanner, as long as you understand the caveats, which are 1) you'll need to research all the analog police frequencies (much of today's police channels have gone to analog 800 MHz or digital P25) that you want to monitor, 2) you'll need to program them all into your radio, and 3) you'll need to understand that you'll only be hearing half the conversations, since police conversations are trunked, and as of 2024 most amateur HTs are not trunked radios.

Dear Annette:

I came in possession of a long (5.3 meters) metal rod that I want to use for a vertical antenna. I've also searched online for how to match this rod so that its SWR will be usable for my radio, but I'm seeing a lot of conflicting information on whether I should use a 4:1 unun or a 9:1 unun. Which do you think I need, and how would you know?

Karel in Provo

Dear Karel:

What you'll need to do is measure the impedance of your vertical antenna radiator (your metal rod), and that will determine the rest; however, determining that rod's impedance will not be easy. To measure its impedance, you'll need to mount it near where you plan to install it, keeping it away (at least two meters) from any nearby conductive objects, such as your ductwork, gutters, metal siding, stucco, and the Earth, and measure it with a good (such as RigExpert) analyzer.

Once you're able to make the measurement, make five of them, throw out the outliers, and take the average of the rest. For example, say your five measurements show 2420 ohms, 2550 ohms, 2480 ohms, 2520 ohms, and 3300 ohms. Since the 3300-ohm measurement is way off from the others (maybe you sneezed while measuring), it becomes the outlier you can discard. The average of the remaining four is 2492.5 ohms, which you'll need to transform down to 50 ohms, requiring a transformation of 2492.5 ÷ 50 = 49.8:1, which is close to 49:1, a common unun transformer value.

Got a question for Dear Annette*? Email it to* ***uvarcshack@gmail.com*** *and include your town name. Sorry, no guarantees.*

The Amateur in You, Part 1

What have you been pondering?

Which radio to get you started

Let's cut to the chase, and then we'll start talking about options and possibilities. You should purchase a Baofeng UV-17R radio, a Signal Stick antenna, and a spare battery, then program it with the frequencies you'll use most in your area.

A handheld transceiver (HT)

When selecting a portable radio that you can quickly take with you when you need it, here are some things to consider:

- Able to receive and transmit on ***2 meters***, which is where most local ham communication takes place on repeaters and nets. Ideally, it should also be a ***dual-band*** radio, supporting ***70 cm***, the second-most used frequency band.
- One for which you can purchase an ***alkaline sled*** or an easy rechargeable option, like USB-C from a solar trickle charger
- One that many of ***your friends have***; it's very convenient to have a radio, for which you can ask for help, or compare notes, or bring to club meetings and discuss
- Should be ***supported by CHIRP***, the free, online radio programming software, to get it programmed quickly, should you need to add a new repeater or net frequency. (You'll need the programming cable that goes to your particular radio model too.)
- Able to receive ***FM broadcast***, allowing you to hear news and information from commercial radio stations during an incident
- Should be not only a dual-band radio, but also a ***dual-watch*** radio, which can allow you to hear incoming communications on two different frequencies at the same time
- Should be ***light-weight*** and small enough to slip onto your pocket or re-sealable sandwich bag
- Should be ***inexpensive***, to allow you to feel free enough to experiment with it and wear it out, without the worry of replacement or repair cost. Some folks will purchase an expensive HT that's loaded with cool features, as their first radio, only to be too afraid to take it hiking with them or do field experiments with it or involve it in events.

Will your choice of radio still be a good one if all the above criteria aren't met? Probably, but there are some minor inconveniences you might have to live with.

A mobile radio

If you're looking to get something a little heftier, whether you install it in your vehicle or set it on your desk, a mobile unit might be what you're looking for. Some of the above suggested criteria still apply, such as dual-band, dual-watch, same model used by friends, CHIRP-supported, and low-cost. Obviously, there are other things to consider when you get a mobile unit, such as:

- A separate 12-volt or 13.8-volt ***power supply***, such as an MFJ MFJ-4230MVP or Powerwerx SS-30DV
- A good, portable antenna, such as a Tram 1185 mag-mount, or a Pockrus J-pole mast-mount antenna
- Some 50-ohm coaxial cable that's long enough to reach from your radio to the antenna, but of a model that minimizes the signal loss, such as RG-8X
- Should deliver (transmit) 25 watts on FM to make it worth your investment

There are other types of radios, such as portable and base units, but the focus here is on getting started, and recommendations for a reasonable deployment.

The Amateur in You, Part 2

What have you been pondering?

Your amateur radio milestones

Back in medieval days, long before our familiar American green mile markers, Europeans often indicated distances to or from localities by tall stones with numerals carved into them. These ***milestones*** helped travelers know that they had reached another mile in their journey to a town.

Today, we use the term *milestone* to indicate one of many successful achievements while progressing toward a larger goal. In the world of amateur radio, one can check off several accomplishments toward the target of becoming licensed, the goal of all the courses, studying, and examinations. But are there other long-term goals to reach after getting your ticket? And if so, what milestones should you reach on your own journey?

On one hand, there's no need to feel pressured into achieving any sort of milestones at any stretch of your radio path. Then again, I have a few suggestions for those who feel sufficiently driven to reach some goals, depending on their interests and interest levels.

Operating proficiency

One of your most important goals is to become proficient at radio operation. This means operating like you know what you're doing, and that takes practice. Here are some milestones:

- Learn how to speak into the microphone
  - How close and how loud
  - How to call out and how to close
  - When to say your call sign
  - How to ask for a signal report
- Talk with a stranger
- Check into a net
- Become acquainted with the terminology
- Learn to manually program your radio
- Serve as Net Control for a net

- Learn how to manipulate your radio
  - Operate simplex, repeater, and reverse
  - Upgrade your antenna and battery
  - How to scan, monitor, and orient
- Teach another person all of this

Technical proficiency

If you're interested in the technical hobby, you might want to become versed at it:

- Learn the educational aspects
  - Electrical knowledge
  - Radio spectrum knowledge
- Upgrade to General or Extra
- Teach a ham radio course

Your amateur radio milestones will depend on your personal goals, and will likely differ from those of others. So, what milestones are appropriate for your own goals?

Noji Ratzlaff, KNØJI (kn0ji@arrl.net)

Hot Tips

Good info for the new ham, and old stuff to refresh your memory

Using a long antenna on your HT

If a newer operator has difficulty hearing others or being heard on an HT, there are a number of remedies the person can try out, to improve handheld performance. One of them is to install a larger or longer antenna, which is a great suggestion, but a long HT antenna has at least one concern that should be considered, and that's the strain it can place on your radio antenna connector.

The amount of torque and stress a long antenna can place on your HT's internal circuit board can be enough to crack the circuit board right at the antenna connector, especially with today's tiny SMA connectors. If you use a quarter-wave antenna, such as a Signal Stick or a Nagoya, its length or weight will not likely overburden your HT. But a half-wave antenna, such as a Smiley telescopic or ABBREE tactical, can place a large amount of stress on your HT's circuit board if you don't use it carefully.

A good way to use a longer HT antenna while relieving some of the strain due to the antenna length or weight is by cradling the HT in your hand, such that your palm is holding the HT body while your index finger and thumb are supporting the weight of the antenna at its base. Another way to help support your longer antenna is to install a washer or other wide mount between the antenna base and your HT, so that when the antenna sways, its base will remain rigid with the HT body.

Tactical antenna (above) and telescopic antenna (right)

Another way to improve the reception and transmission of your HT is by connecting it to a rooftop antenna by means of coax. But this also poses a strain on your HT circuit board by excessive sideways tugging on your connector as you move around while your antenna remains stationary. As much as possible, try and remember to hold still while using your HT in this way.

So, using a longer antenna is a great way to overcome signal difficulties with your HT, as long as you understand the strain it can place on your little radio. If you're careful, the larger antenna can work well for you while keeping your radio safe.

DIY

Worthwhile projects you can build on your own

RTL-SDR waterfall by Airspy

Ever since they've seen the waterfall on the screens of their friends, numerous envious hams have wanted to know how to display something similar on their own screens. This short project will walk you through the steps of doing exactly that. Then, your computer screen will be the envy of other operators.

The two keys are the RTL-SDR dongle (a device that hangs off your computer USB port) and the Airspy software. Although I've listed the original silver V3 dongle below, the black V3 or V4 dongle will also work. The RTL-SDR device is known as an ***SDR*** (software-defined receiver), as its name implies, meaning that nearly all the radio functions (pre-amplification, oscillation, mixing, filtering, demodulation, etc.) are built into software (firmware, actually), and that it's intended for receiving signals, not transmitting them.

Furthermore, your financial situation might put a nice, expensive rig outside your reach for that pretty waterfall screen. For less than fifty bucks, you can have the entire HF world at your fingertips. It's assumed, however, that you have already installed an antenna capable of receiving the band(s) that you want to display. Then again, even if you don't have a proper ham radio antenna, a long piece of wire will also work, since this is a receive-only setup.

These instructions are taken from a subset of those found on the RTL-SDR Quick Start Guide. One problem is that the online instructions are somewhat technical and a little confusing, so the hope here is to help you navigate the setup quickly and easily. To do so, however, it's assumed that you'll be installing the Airspy software onto Windows 10 or 11. Similar software is available for Linux and Mac (instructions at the end of the online Quick Start Guide), but I'm going to walk you through the Windows application setup.

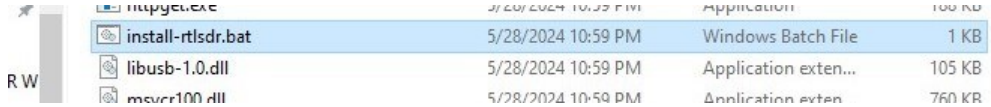
Parts list

One RTL-SDR dongle

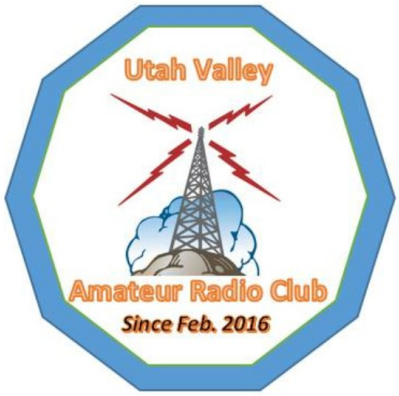
One SMA-Male to SO-239 jumper

Software installation

1. Open a browser and visit https://airspycom
2. At the top of the page, click Download
3. After "Software Defined Radio Package (Change Log)" click the Download button
4. Open your computer's Downloads folder, then Extract all the files of the sdrsharp-x86.zip file into your Downloads folder
5. Double-click install-rtlsdr.bat



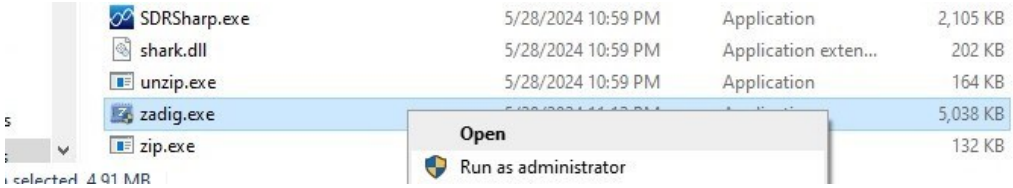
6. If you see a "Windows protected your PC" window, click "More info"; skip to 8 if you don't



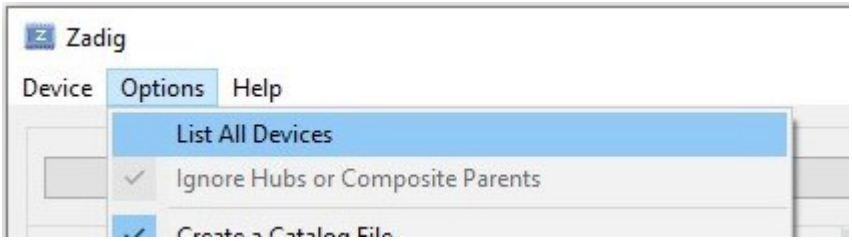
DIY, continued

RTL-SDR waterfall by Airspy

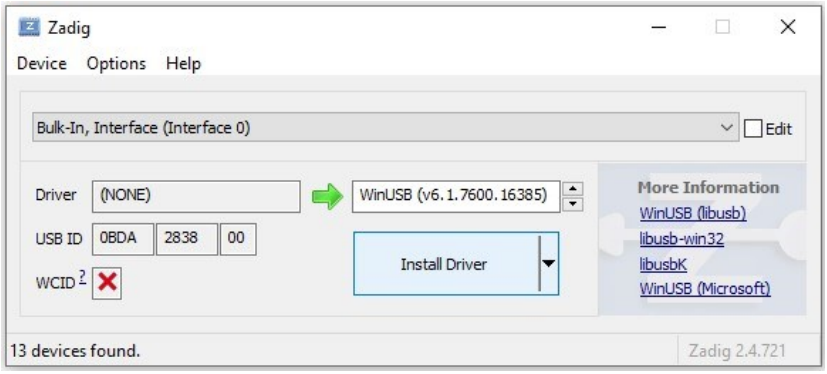
7. Click “Run anyway” near the bottom
8. Once the download completes, after it displays “Press any key to continue. . .” at the end, press the space key
9. Plug the RTL-SDR dongle into your computer’s USB port, and wait until Windows tells you that it has detected a new device, and then that all its drivers are installed
10. Locate the zadig.exe file in the folder where you extracted the first files, right-click it, then select **Run as administrator** and confirm that you allow the program to make changes


SDRSharp.exe 5/28/2024 10:59 PM Application 2,105 KB
shark.dll 5/28/2024 10:59 PM Application exten... 202 KB
unzip.exe 5/28/2024 10:59 PM Application 164 KB
zadig.exe 5,038 KB
zip.exe 132 KB
Open
Run as administrator

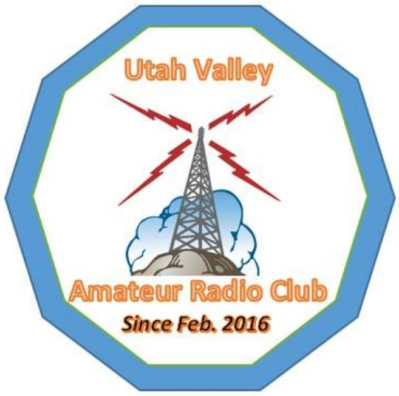
11. In the Zadig program, click the **Options** tab, then select **List All Devices**



12. Click the long drop-down and select **Bulk-In, Interface (Interface 0)**
13. The Zadig window should show a) “WinUSB” to the right of the green arrow and b) “0BDA 2838 00” in the **USB ID** boxes



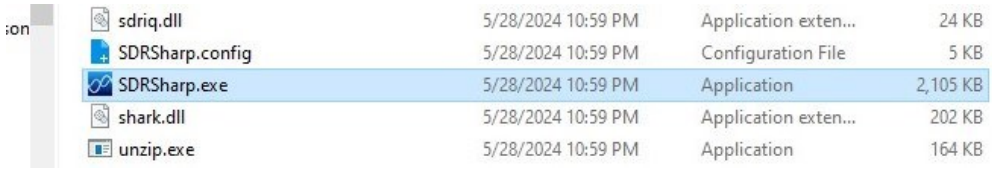
14. Click the big box in the middle, which should read **Replace Driver** or **Install Driver**, then click through the warnings, if any should appear



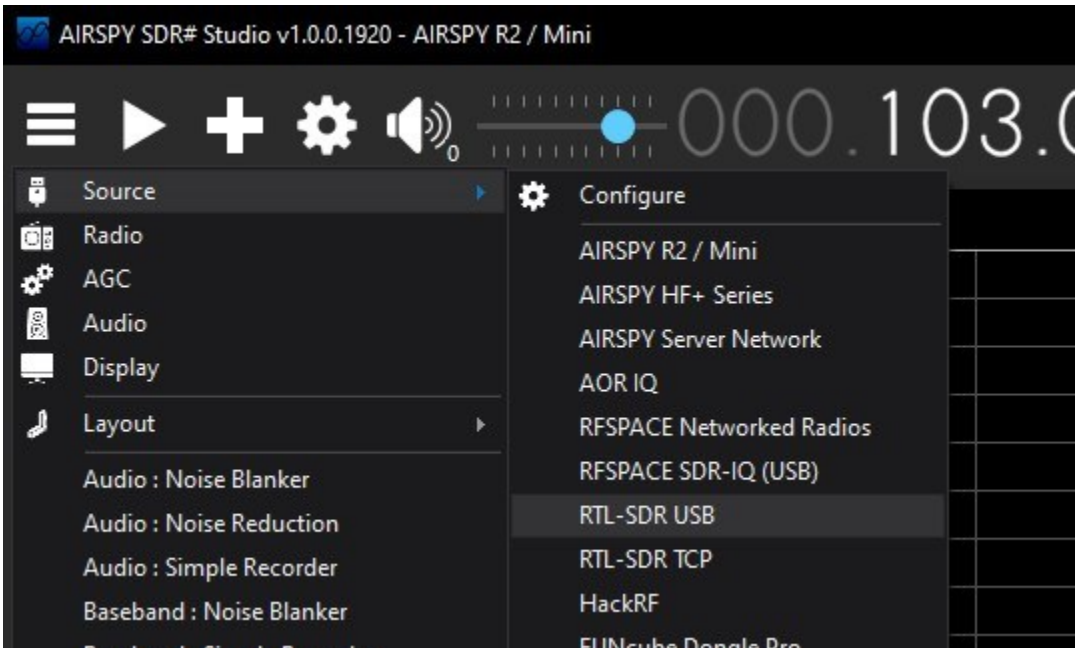
DIY, continued

RTL-SDR waterfall by Airspy

15. Once Zadig reports that the driver has been installed, click Close
16. Locate the SDRSharp.exe file in the folder where you extracted the first files, and double-click it to open SDRSharp (if you see more than one, double-click the Application)


sdriq.dll 5/28/2024 10:59 PM Application exten... 24 KB
SDRSharp.config 5/28/2024 10:59 PM Configuration File 5 KB
SDRSharp.exe 5/28/2024 10:59 PM Application 2,105 KB
shark.dll 5/28/2024 10:59 PM Application exten... 202 KB
unzip.exe 5/28/2024 10:59 PM Application 164 KB

17. If a message pops up that prompts you to install the .NET Desktop Runtime, click Download it now, then go through the steps to install it
18. If you had to install the .NET Desktop Runtime, double-click SDRSharp.exe again
19. Click the hamburger menu (the three horizontal lines in the upper-left corner)
20. Hover over Source and select **RTL-SDR USB**



21. Click the **Play** button (right-pointing triangle), and the SDR will start

Hardware installation

By now, you've already attached the RTL-SDR dongle to your USB port. Next, install a jumper to the SMA connector of the dongle, then your antenna coax to the other end of the jumper. You should start seeing signals appear on the AirSpy waterfall, but they're not likely tuned to any meaningful frequency.

DIY, continued

RTL-SDR waterfall by Airspy

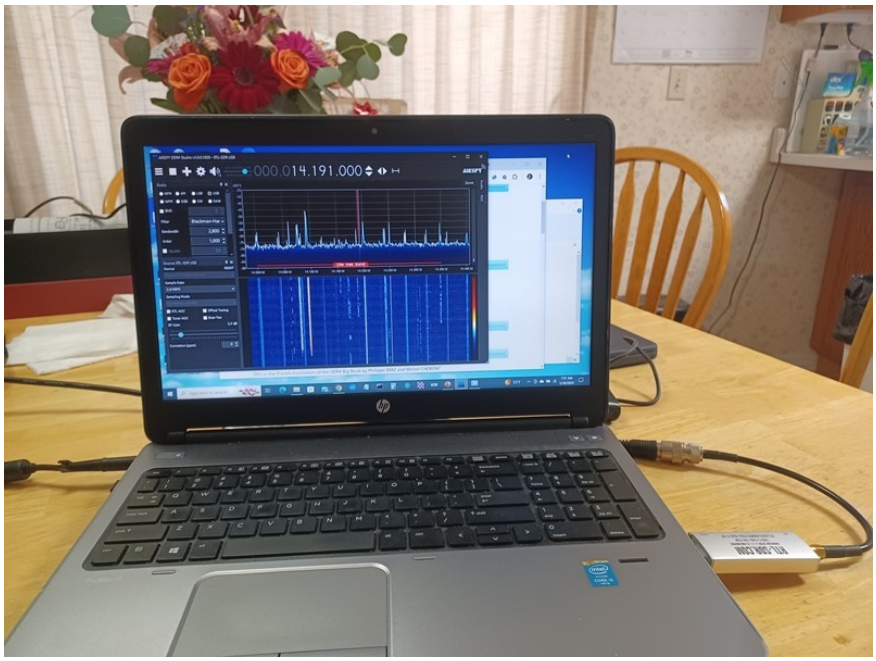
Software operation

1. Click on the large numerals to tune to your frequency of choice. When you click on the upper-half of each digit, the frequency changes to a higher frequency according to the order of the digit. The frequency changes to a lower frequency when you click on the lower half. For example, if the frequency shown is 103.000.500, and you click on the bottom half of the "3" digit, the display changes to 102.000.500, and so forth.
2. Near the upper-right corner, click Zoom and drag the slider up and down to adjust the displayed range. Play with the other settings under Zoom to adjust the display to your taste.
3. For amateur frequencies keep the Bandwidth to between 2,400 and 2,800.
4. Some tips for a better view or listening experience include lowering the RF gain, lowering the Offset, and lowering the Contrast.

Summary

A software-defined radio is a radio receiver, complete with tuning and other controls, made from software and embedded onto a USB stick device. The argument can be made that the web SDR does precisely the same thing and more (because of its magnificent antennas), but the web SDR depends on the internet connection, and you have complete control of your own SDR. I'm pretty sure similar software exists for my Samsung (Android OS) phone, so that might be homework for me next time.

Noji Ratzlaff, KNØJI (kn0ji@arrl.net)

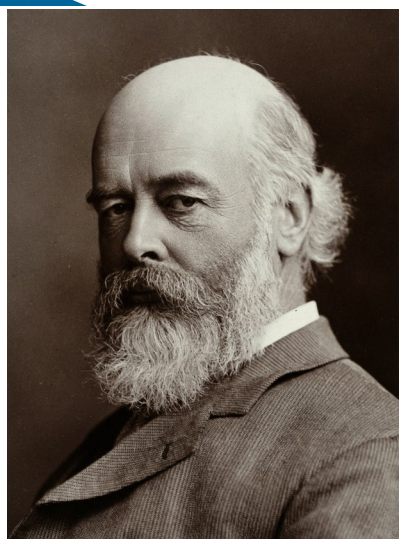


My finished RTL-SDR setup, complete with flowers

Living in the Past

Historical perspective

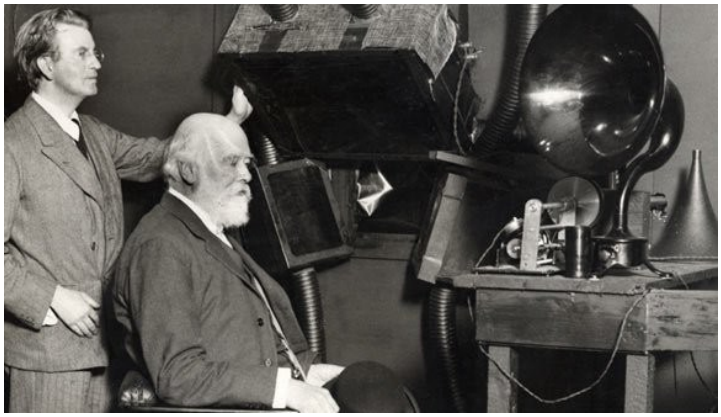
Inventor of wireless telegraphy



At the age of 16, soon after he had enrolled at the Royal College of Science in London, Oliver Lodge discovered he had a gift for science. By the time he earned his PhD at the University College of London, Oliver had crossed educational and career paths with many renowned physicists, including John Tyndall, James Clerk Maxwell, and Heinrich Hertz.

Once he became captivated by the prospect and potential of wireless communication, Oliver soon developed a rivalry with Guglielmo Marconi. Although Marconi is credited with the first radio broadcast in 1896, Oliver had actually demonstrated wireless telegraphy two years previous at Oxford University, culminating in over a decade of disputes over the invention of radio.

Thanks to Oliver Lodge, Marconi also used an improved version of the "coherer" detector, in which iron filings in a glass tube were positioned between two electrodes. When radio waves were applied to the electrodes, the filings would "clump" together and close the circuit. Lodge improved on this coherer by adding a "trembler" to shake the tube and dislodge the clump after each radio signal. The name arises from the behavior of the filings to stick together, or cohere, upon being charged.



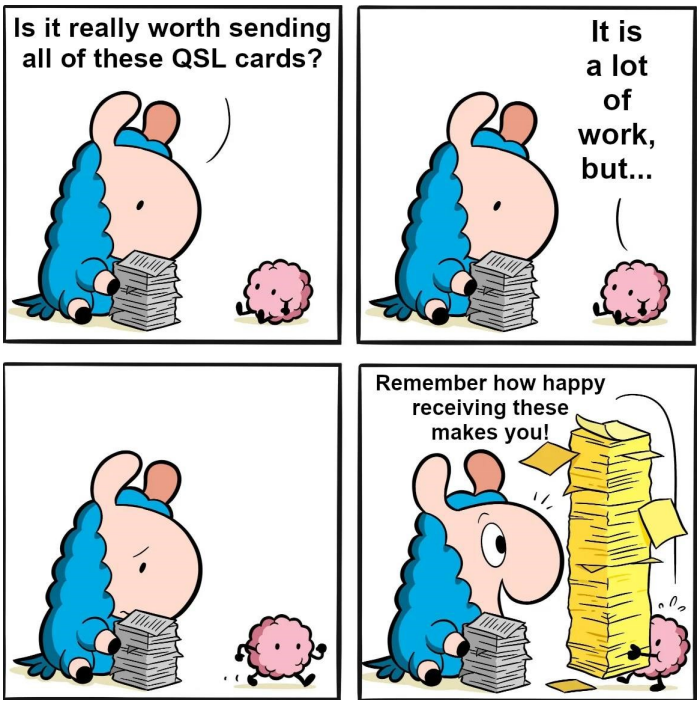
Much of Oliver's exploration into electromagnetic (radio wave) phenomena came about as a result of a challenge presented to him by the Royal Society of Arts, to explain why lightning does not behave as many expect. Many structures had been damaged, in spite of lightning protection, because the huge electrical currents took alternate paths through them instead of through the cabling provided it, puzzling many. This led Oliver to experiment with high-capacity Leyden jars that held large amounts of charge, and carefully observe the results. He found that the charges took the shorter, higher-resistance paths rather than the longer, lower-resistant ones.

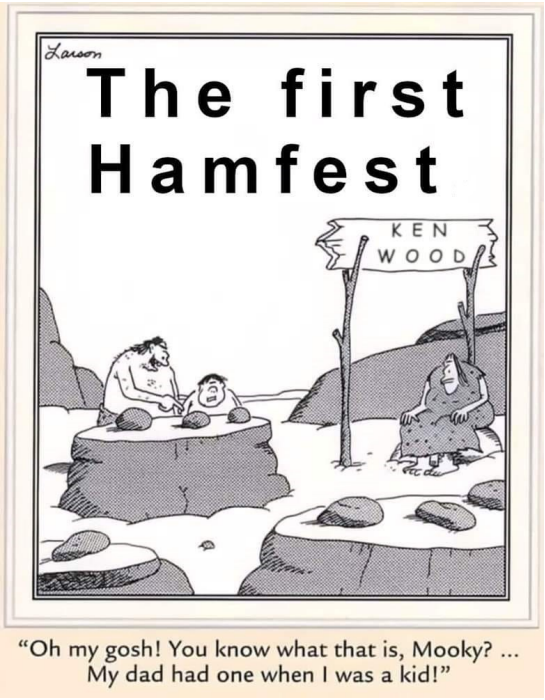
Among his other achievements credited to Oliver were the Lodge "igniter," an early form of the automobile engine spark plug, the loudspeaker (using a coil surrounding a permanent magnet and attached to a diaphragm), and an early form of a variable tuner.

For his many contributions to science, Oliver Lodge was knighted in 1902 by King Edward VII. You can read more about the life of Oliver Lodge on *National Inventors Hall of Fame* and *All About Circuits*.

Side of Bacon

A little ham humor





"Oh my gosh! You know what that is, Mooky? ... My dad had one when I was a kid!"

YOU CAN RADIATE FARTHER WITH

"NATIONAL" HI-TONE ROTARY SPARK GAP

Emits a high tone musical note. It is audible at greater distances than note from ordinary gap. It will increase your transmitting range 30 per cent.

The motor is a dependable high speed type, has speed regulator and shut off. Speed can be regulated from 3000 to 6000 R. P. M. Will operate on 110 volt A. C. or D. C. circuits, also can be furnished to operate on batteries.

The aluminum rotor is mounted on a genuine hard rubber disk which is affixed to the motor shaft. The electrodes are also made of aluminum highly polished. The base is genuine Italian marble, hand polished. High class workmanship used throughout, its appearance is very attractive. Can be used on spark coils or transformers up to 1 K. W.

Very reasonably priced at $12.00. Send for latest circular

NATIONAL ELECTRIC MANUFACTURING CO.

2118 MALLERS BLDG. CHICAGO, ILL.

For Your Insight

Information you could use

Club meeting format

Here's the usual agenda for club meetings, at the Orem City Council Chamber Room, 56 N State St:

Talk-in frequency on the club repeaters

6:30 pm : Eyeball QSO

socialize / put faces with call signs

radio programmers available to help you

6:45 pm : Call the meeting to order

meeting lineup (agenda)

announcements / calendar / new hams

7:00 pm : Discussion / presentation

7:45 pm : Door prizes

7:55 pm : Dismiss and disassemble

8:00 pm : *Club QSY* to a local eatery

Something you'd like to see at the meetings?

Thanks to Heath Stevenson for making our monthly meetings possible!

Monthly meeting help

We're grateful for the volunteers who help with various tasks that make our club night just that much more friendly and useful to everybody. Monthly, we need help with

programming radios (thanks, Ralph!)

taking photos or videos during the meeting (thanks, Joe!)

operating the talk-in radio

setting up tables and chairs (thanks, Heath!)

Lynx

Websites for your education and leisure

Ham Radio Equipment
Ham Radio Nets
Radio Programming
Net Training Topics
76ers Group and UVARC Group pages
New Ham Page

Send your input to ***uvarcshack@gmail.com***

Test your knowledge

General and Extra review (answers next page)

G7CØ7 : What term specifies a filter's attenuation inside its passband?

A. Insertion loss
B. Return loss
C. Q
D. Ultimate rejection

E2AØ5 : What do the letters in a satellite's mode designator specify?

A. Power limits for uplink and downlink transmissions
B. The location of the ground control station
C. The polarization of uplink and downlink signals
D. The uplink and downlink frequency ranges

Calendar

What's happening
(times are Mountain Time)

Provo Ham Exam Sessions

Provo Fire Station #2, 2737 N Canyon Rd

Sign up at HamStudy.org/sessions

Wed 16 Oct, 7:00 to 8:30 pm
Sat 19 Oct, 2:30 to 5:00 pm
Sat 16 Nov, 2:30 to 5:00 pm
Wed 20 Nov, 7:00 to 8:30 pm
Wed 18 Dec, 7:00 to 8:30 pm
Sat 21 Dec, 2:30 to 5:00 pm

*Email **uvhamtest@gmail.com** for info*

Provo One-day Technician Courses*

Third Saturday Monthly at 8:00 am

Provo Fire Station #2, 2737 N Canyon Rd

** September through April*

2025 Orem Ham Radio Courses

Sign up at psclass.orem.org

Technician : Jan 21, 28, Feb 4, 11
General : Mar 18, 25, Apr 1, 8
Extra : Jul 15, 22, 29, Aug 5, 12
Technician : Sep 16, 23, 30, Oct 7

Club Meeting Calendar (6:30 pm)

On YouTube Live, and Facebook Live

October 3	November 7
December 5*	January 2
February 6	March 6
April 3	May 1

† *Ham Radio Fair, Pheasant Brook Park*

* *At the Orem Friendship Center*

Regular Nets

UVARC Family Net, Sun 3:30 pm, 146.780
NE UC ERC Net, 1st Sun 9:00 pm, 147.540s
UVARC Ladies' Net, Tue 7 pm, 146.780
DMR Utah Net, Wed 6 pm, TG 3149, CC 1
Utah 76'ers, Wed 7 pm, 146.760
UVARC HF Net, Wed 9 pm, 28.345 / 7.220
UVARC New Ham Net, Thu 7 pm, 146.780
CERT Ham Net, 2nd, 4th Thu 8:pm, 146.780
Utah County 6-meter Net, Fri 8 pm, 50.140
Family History Net, Sat 8 pm, 146.780
See a larger list of nets at noji.com/nets

Upcoming Contests

California QSO Party
10 am Sat Oct 5 to 4 pm Sun Oct 6

State QSO Parties
Sat Oct 12 : NV, AZ, PA, SD

CQ Worldwide DX Contest, SSB
6 pm Fri Oct 25 to 6 pm Sun Oct 27

ARRL Sweepstakes Contest, SSB
2 pm Sat Nov 16 to 8 pm Sun Nov 17

See a larger list at contestcalendar.com

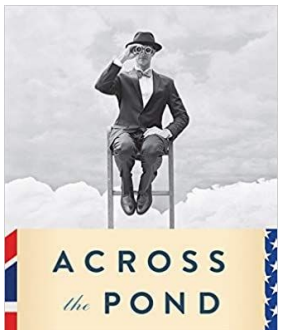
Answers to *Test your knowledge*

G7CØ7 : **A** (Insertion loss) [the only loss within the passband is due to the filter itself, and the loss due to the filter itself is known as *insertion loss*]

E2AØ5 : **D** (The uplink and downlink frequency ranges)

Across the Pond

That is, the Utah Lake 'pond'



Eagle Mountain ham radio activities

A list of amateur radio activities near Eagle Mountain, organized primarily by Dave Becar KI6OSS. Unless otherwise noted, all these activities will be held at the Eagle Mountain City Hall, 1650 Stagecoach Run. Please contact Dave at **ki6oss6365@gmail.com** to register for any of the classes or exams, for any additional information, or questions in general.

February 2025 Technician Course

Thu 13 February, 7 to 9 pm
Thu 20 February, 7 to 9 pm
Thu 27 February, 7 to 9 pm
Thu 13 March, 7 to 9 pm
Thu 20 March, 7 to 9 pm

Ham Radio Exam Session

Sat 22 March 10 am
Open to all, for any license class

May 2025 General Course

Thu 08 May, 7 to 9 pm
Thu 15 May, 7 to 9 pm
Thu 22 May, 7 to 9 pm
Thu 29 May, 7 to 9 pm
Thu 12 June, 7 to 9 pm

Ham Radio Exam Session

Sat 14 June, 10 am
Sat 28 June, 10 am (Field Day)
Open to all, for any license class

August 2025 Technician Course

Thu 14 August, 7 to 9 pm
Thu 21 August, 7 to 9 pm
Thu 28 August, 7 to 9 pm
Thu 11 September, 7 to 9 pm
Thu 18 September, 7 to 9 pm

Ham Radio Exam Sessions

Sat 20 September, 10 am
Sat 27 September, 10 am (Swap Meet)
Open to all, for any license class

October 2025 Technician Course

Thu 09 October, 7 to 9 pm
Thu 16 October, 7 to 9 pm
Thu 23 October, 7 to 9 pm
Thu 30 October, 7 to 9 pm
Thu 13 November, 7 to 9 pm

Ham Radio Exam Session

Sat 15 November, 10 am
Open to all, for any license class

Ham Radio Nets

Eagle Mountain ECT Net
Sundays, 9 pm 145.230- MHz (131.8 Hz)

Eagle Mountain Chimney Rock Stake
Sundays 8:30 pm 446.500 (s)

Eagle Mountain Central Stake
Saturday 8 pm 145.650 (s)

Vendors

For your convenience

Pockrus Joystick J-pole

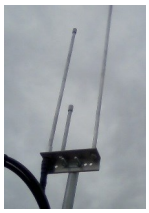
$30, open-stub aluminum half-wave, dual-band J-pole antenna

$40, 6-meter dipole, $20 for the 220 MHz (1.25 m) antenna

by Carl Pockrus, WE7OMG (email omgantennas@gmail.com to order)

Half-wave performance, solid construction, weather-proof, low wind-load

Probably the best-performing outdoor antenna you can get for the price



Super-Elastic Signal Stick

$22, vertical quarter-wave flexible antenna

by Richard Bateman, KD7BBC, of *SignalStuff* (and maker of *HamStudy*)

Super-performing antenna for your HT (handhold transceiver)

Visit SignalStuff and select SMA-Male, SMA-Female, or BNC

Ham Radio Podcasts v1.50

by Trevor Holyoak, AG7GX (email android@holyoak.com)

Stream podcasts (such as *100 Watts and a Wire*, *Amateur Radio Newsline*, *ARRL Audio News*, etc.) or download for later listening

For Android 4.1 and up (ad-free available for purchase)

Club Logo and Call Sign Embroidering

Want your call sign or name (or both!) embroidered on your shirt, your hoodie, your duffle? Or how about a club patch with your call sign?

by Glenna Gardner, WE7SEW (glenna0354@gmail.com or text 801-592-2503)

Call sign or name = $5, Both = $8, UVARC patch = $5, Patch with call = $9

Portable Aluminum J-pole

$60, sectioned, open-stub aluminum half-wave, dual-band J-pole antenna

by Stan, KJ7BDV and Kent, N7EKF (email skantenna@yahoo.com for info or call 801-372-7260)

Complete antenna breaks down into a compact 2″ x 6″ x 12″ package weighing only 3 lbs, perfect for backpacking and portable work where you really need a good 2-meter antenna

HamBadgers

Amateur radio name badges and other products

$10, official UVARC ham radio name badge with the club logo

Visit Ham Badgers and select Ham Radio Clubs > Utah Valley Amateur Radio Club

Email Eric Palmatier at hambadgers@gmail.com or call 919-249-8704

Where everybody knows your call sign

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Orem, Utah, 84059-1288 USA

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Email: k7uva@arrl.net

Repeaters: 146.780–, 100.0
448.200–, 100.0 224.560–, 100.0
145.250–, 100.0 448.225–, 100.0
Newsletter input?
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[See all our newsletters on uvarc.club]

We are the *Utah Valley Amateur Radio Club*, a 501(c)(3) non-profit (EIN 81-360-6416) Utah corporation (9752825-0140) that was organized in an obscure Orem fire station on 02-05-2016 to provide amateur radio enthusiasts in Utah County and surrounding areas a way to gather and discuss all things ham. Our primary purposes are to provide a local amateur radio resource, help new hams in their new-found adventures, and to give more experienced hams a reason to share their wealth of knowledge and wisdom in a friendly atmosphere of fellowship. We're an ARRL Affiliate and work in cooperation with the Utah VHF Society, but are not subsidiary to them, to ARRL, ARES, or any other organization, although many of our members and leaders might also belong to the same.

This newsletter is copyrighted and published by the Utah Valley Amateur Radio Club, and its purpose is to convey the tone and temperament of the club, to inform and entertain its members, and to entice the rest. To join, go to uvarc.club/join, then sign up at www.facebook.com/groups/uvarc/ to stay informed. For more information about our club or about amateur (ham) radio in general, please email or text or call us.

More than just a club, we invite you to become part of a great ham radio friendship in Utah Valley

Our fearless leadership

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From all of us to you, 73